

generally radially relative to said axis during rotation of said control device.

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--15. (new) The apparatus of claim 13, further comprising a second control arm pivotally linked to said movable head rest and to a second joint that moves in said arcuate slot, said second control arm pivoting said movable head rest during rotation of said control device.--

REMARKS

Initially, it is noted that the Official Action of November 29, 2001 did not consider the Preliminary Amendment filed with the original application on June 30, 2000. The Preliminary Amendment added the dependency of claim 2 and corrected the multiple dependencies in other claims. A copy of the Preliminary Amendment as filed is enclosed. Since the first action did not consider the claims as filed, the applicant has been denied a full examination of the claims as filed, and a new non-final Official Action is respectfully requested if the application is not yet in condition for allowance.

The PTO-1449 provided with the Official Action does not include the Examiner's initials indicating the French reference was considered. Please send a revised PTO-1449 initiated to indicate that the French reference has been considered.

The specification and claims 1-12 have been amended to make editorial changes therein, bearing in mind the criticisms in

the Official Action, and an abstract has been added on a separate sheet, to place the application in condition for allowance at the time of the next Official Action.

The indication that claim 3 includes patentable subject matter is acknowledged with thanks. In reliance thereon, claim 3 has been amended into independent form by adding the subject matter of claim 1 thereto. Allowance of claim 3 and dependent claims 4-6 and 8-12 is respectfully requested.

Claim 1 was rejected as anticipated by BOREN 5,360,383. Claim 1 provides, among other features, that the multi-joint angular linkage mechanism is connected to the head rest and causes the head rest to move along a curved path that substantially coincides with a natural path of a person's neck during flexion and extension movements without producing relative motion between the head rest and the place where the head rest contacts the person's neck.

BOREN does not disclose this feature and thus claim 1 avoids the rejection under §102. BOREN discloses a generally U-shaped movement arm 58 with a head rest 60 against which a person exerts a rearward force during pivotal movement of the movement arm 58. As is apparent from the connections of the movement arm 58 shown in Figure 1, the movement arm 58 rotates about a single axis and thus moves circularly. However, the natural path of the neck resembles an ellipse, as noted in the present application at page 1, line 25 through page 2, line 17. The problem with the

prior art apparatus such as disclosed in BOREN is that the path of the neck holding part does not follow the neck's natural path: it moves in a circular arc (page 3, lines 5-17). The invention defined in claim 1 avoids this problem by moving the neck holding part in a path that coincides with the natural path, not a circular one as disclosed in BOREN. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Claim 2 further provides that the movement of the head rest follows a path of varying radius. BOREN discloses that the movement arm moves circularly and thus the head rest in BOREN does not follow a path of varying radius. Allowance of claim 2 is also respectfully requested.

New claims 13-15 have been added and consideration and allowance of these new claims are respectfully requested. The new claims provide that the exercise/rehabilitation apparatus includes a control device that has an arcuate slot therein that is spaced from the axis about which the control device rotates, and a control arm pivotally linked to the head rest and to a joint that moves in the arcuate slot, where the control arm moves the head rest in a path with a varying radius during rotation of the control device. BOREN does not disclose the arcuate slot or the control arm that is pivotally linked to the head rest and to a joint that moves in the arcuate slot. Accordingly, the new claims are believed to avoid the rejection of record.

In view of the present amendment and the foregoing

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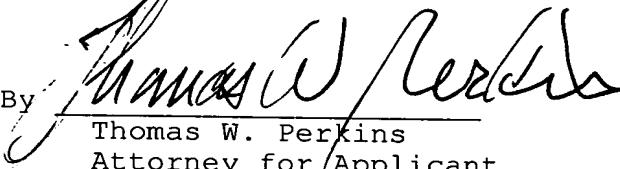
remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

Attached hereto is a marked-up version showing the changes made to the abstract, specification and claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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## ABSTRACT OF THE DISCLOSURE

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The apparatus includes a link rod (5) pivoted by its first end (6) on the equipment frame via a first joint (7) permitting a turning motion about a swing axis (8) perpendicular to the vertical middle plane of the seat. A head rest (9) is functionally connected to the link rod (5) so that the link rod participates in turning the head rest during an exercise movement while the person's head is leaning against the head rest. The apparatus also includes a multi-joint angular linkage mechanism (12), of which the link rod (5) constitutes a part. The multi-joint angular linkage mechanism (12) is connected to the head rest (9) so as to cause it to move during an exercise movement along a curved path that substantially coincides with the natural path of the neck.

"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

ABSTRACT OF THE DISCLOSURE

The apparatus [comprises an equipment frame (1), a seat (2) provided with a back rest (3), and holding means (4) for holding a person's body substantially immobile in position relative to the back rest. A] includes a link rod (5) [is] pivoted by its first end (6) on the equipment frame via a first joint (7) permitting a turning motion about a swing axis (8) perpendicular to the vertical middle plane of the seat. A head rest (9) is functionally connected to the link rod (5) so that the link rod participates in turning the head rest during an exercise movement while the person's head is leaning against the head rest. [A resistance means (10) generates a force opposing the exercise movement. The apparatus comprises adjusting elements (11) for adjustment of the position of the seat in relation to the equipment frame (1). The head rest (9) is substantially fitted to receive the upper part of the person's neck.] The apparatus [comprises] also includes a multi-joint angular linkage mechanism (12), of which the link rod (5) constitutes a part. The multi-joint angular linkage mechanism (12) is connected to the head rest (9) so as to cause it to move during an exercise movement along a curved path that substantially coincides with the natural path of the neck.

IN THE SPECIFICATION:

Page 1, the paragraph, beginning on line 3, has been amended as follows:

--The present invention relates to an apparatus for exercising or rehabilitating neck extensors [as defined in the preamble of claim 1].--.

IN THE CLAIMS:

Claim 1 has been amended as follows:

--1. (amended) [Apparatus] An apparatus for exercise and/or rehabilitation of neck extensors by flexion and extension movements, said apparatus comprising:

an equipment frame (1), a seat (2) provided with a back rest (3), and holding means (4) for holding a person's body substantially immobile in position relative to the back rest;

a link rod (5) pivoted by its first end (6) on the equipment frame via a first joint (7) permitting a turning motion about a swing axis (8) perpendicular to [the] a vertical middle plane of the seat;

a head rest (9) functionally connected to the link rod (5) so that the link rod participates in turning the head rest during an exercise movement while the person's head is leaning against the head rest[, and];

a resistance means (10) for generating a force opposing the exercise movement[, characterised in that the apparatus comprises];

adjusting elements (11) for adjustment of [the] a position of the seat in relation to the equipment frame (1);

[that] the head rest (9) [is] being substantially fitted to receive [the] an upper part of the person's neck[, preferably the area of the topmost two cervical vertebrae]; and

[that the apparatus comprises] a multi-joint angular linkage mechanism (12), of which the link rod (5) constitutes a part, said multi-joint angular linkage mechanism (12) being connected to the head rest (9) so as to cause it to move during an exercise movement along a curved path that substantially coincides with [the] a natural path of the person's neck during flexion and extension movements of the person's neck without producing any relative motion between the head rest (9) and [the] a point of contact between the person's neck and the head rest (9).--

Claim 2 has been amended as follows:

--2. (twice amended) [Apparatus] The apparatus as defined in claim 1, [characterised in that the] wherein movement of the head rest (9) follows a path of varying radius[, such as an elliptical path].--

Claim 3 has been amended as follows:

--3. (twice amended) [Apparatus as defined in claim 1, characterised in that] An apparatus for exercise and/or rehabilitation of neck extensors by flexion and extension movements, said apparatus comprising:

an equipment frame (1), a seat (2) provided with a back rest (3), and holding means (4) for holding a person's body substantially immobile in position relative to the back rest;

a link rod (5) pivoted by its first end (6) on the equipment frame via a first joint (7) permitting a turning motion about a swing axis (8) perpendicular to a vertical middle plane of the seat;

a head rest (9) functionally connected to the link rod (5) so that the link rod participates in turning the head rest during an exercise movement while the person's head is leaning against the head rest;

a resistance means (10) for generating a force opposing the exercise movement;

adjusting elements (11) for adjustment of a position of the seat in relation to the equipment frame (1);

the head rest (9) being substantially fitted to receive an upper part of the person's neck; and

a multi-joint angular linkage mechanism (12), of which the link rod (5) constitutes a part, said multi-joint angular linkage mechanism (12) being connected to the head rest (9) so as to cause it to move during an exercise movement along a curved

path that substantially coincides with a natural path of the person's neck during flexion and extension movements of the person's neck without producing any relative motion between the head rest (9) and a point of contact between the person's neck and the head rest (9)

wherein the multi-joint angular linkage mechanism (12) is functionally a [so-called] five-joint planar mechanism[; that], wherein the apparatus further comprises a control gear (13) for controlling [the] motion of the multi-joint angular linkage mechanism[; that], wherein the control gear (13) is rotatable about a swing axis (14) immovable with respect to the equipment frame (1)[;], and wherein [that] the swing axis (14) is disposed at a distance from the first joint (7) but in its vicinity.--

Claim 4 has been amended as follows:

--4. (twice amended) [Apparatus] The apparatus as defined in claim [1] 3, [characterised in that] wherein the apparatus further comprises an auxiliary link rod (15), whose first end is pivotally mounted on the equipment frame (1) via a second joint (17) disposed at a distance from the first joint (7) but in its vicinity; and a head rest support (18) to which the head rest (9) is attached, [the] a second end (19) of the auxiliary link rod (15) being pivoted on said head rest support via a third joint (20);

[that] wherein the control gear (13) comprises a first frame component (21), which is rotatably mounted on the equipment frame (1) and provided with a first guide (22) disposed at a distance from [the centre] a center of rotation of the first frame component (21), and a second frame component (23), which is provided with a second guide (24), forming a guide pair with the first guide, permitting movement of the second frame component in a direction determined by the first and second guides in relation to the first frame component;

[that] wherein the head rest support (18) is pivoted on the second frame component (23) via a fourth joint (25) disposed at a distance from the third joint (20);

[that the] wherein a second end (26) of the link rod (5) is pivoted on the second frame component (23) via a fifth joint (27) disposed at a distance from the third joint and the fourth joint[, the five-joint planar mechanism thus consisting of the rigid parts of the mechanism and equipment frame between the first, second, third, fourth and fifth joints].--

Claim 5 has been amended as follows:

--5. (amended) [Apparatus] The apparatus as defined in claim 4, [characterised in that] wherein the link rod (5) comprises second adjusting elements (28) to allow adjustment of [the] a distance between the first joint (7) and the fifth joint (27).--

Claim 6 has been amended as follows:

--6. (twice amended) [Apparatus] The apparatus as defined in claim 4, [characterised in that] wherein the auxiliary link rod (15) comprises third adjusting elements (29) to allow adjustment of [the] a distance between the second joint (17) and the third joint (20).--

Claim 7 has been amended as follows:

--7. (twice amended) [Apparatus] The apparatus as defined in claim 1, [characterised in that] wherein the resistance means (10) [has been fitted to oppose the] opposes a turning motion of the link rod (5) [and/or auxiliary link rod (15)].--

Claim 8 has been amended as follows:

--8. (twice amended) [Apparatus] The apparatus as defined in claim [1] 4, [characterised in that the apparatus] further [comprises] comprising a turning arbor (30) rotatably mounted with bearings on the equipment frame (1)[; that], and wherein the first frame component (21) is attached to the turning arbor (30)[;] and [that] the resistance means (10) is connected to the turning arbor (30) to generate a torque opposing the rotation of the turning arbor.--

Claim 9 has been amended as follows:

--9. (amended) [Apparatus] The apparatus as defined in claim 8, [characterised in that] wherein the resistance means

(10) [works on a gravity resistance principle; and that the resistance means] comprises a counterweight (31) [consisting of a number of] with plural individual weight elements (32) [of a given weight], which can be combined so as to create a predetermined load.--

Claim 10 has been amended as follows:

--10. (amended) [Apparatus] The apparatus as defined in claim [9] 8, [characterised in that] wherein the resistance means (10) comprises an eccentric gear (33) connected to the turning arbor (30) and [comprising] an eccentric surface (34) [or the like; and], a flexible elongated draw element (35) connected to the counterweight (31) and, [on the other hand, arranged in functional contact with the eccentric surface or the like, so that, as the draw element is wound around the eccentric surface or the like,] a load opposing the exercise movement with a force that varies in a predetermined manner as a function of the rotational angle of the turning arbor.--

Claim 11 has been amended as follows:

--11. (twice amended) [Apparatus] The apparatus as defined in claim 4, [characterised in that] wherein the first frame component (21) comprises a balancing counterweight (36) for balancing the structural assembly rotating about the swing axis (14).--

Claim 12 has been amended as follows:

--12. (amended) [Apparatus] The apparatus as defined in claim 11, [characterised in that] wherein the first frame component (21) comprises fourth adjusting elements (37) to allow adjustment of the distance of the balancing counterweight (36) from the swing axis (14).--